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Vogtle Project

December 21, 1987

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

File: X7BC35
Log: GN-1419

NRC DOCUMENT NUMBERS 50-424 AND 50-425
OPERATING LICENSE NPF-68
CONSTRUCTION PERMIT NUMBER CPPR-109
VOGTLE ELECTRIC GENERATING PLANT - UNITS 1 AND 2
CLARIFICATION OF FSAR 9.5.3 - EMERGENCY LIGHTING

Gentlemen:

In response to questions from your staff regarding the Amendment 34 to the Vogtle FSAR submittal on emergency lighting, we clarify our submittal as follows:

1. Footnote 'g' to Table 430.5-1 states that lighting levels lower than those shown in the table will be verified as acceptable for the task at hand by operating personnel. Pre-operational test 1-3QD-01 was completed to verify this commitment.

2. Dedicated portable DC units are provided to aid the operators when traversing access routes from the main control room to remote shutdown locations. These DC units are administratively controlled and subject to periodic surveillance.

3. A single sealed beam modular unit with a self-contained battery and charger unit which is rated for 8-hour minimum operation upon loss of power to the essential lighting system is provided for each control room. These units are located on the column adjacent to the shift supervisors office (shown on Figure 6.4.2-1) and illuminate the general area of the main control board.

4. As noted in footnote 'e' to Table 430.5-1 the luminous ceiling is designed and qualified to Seismic Category 1 requirements, and while lamps are not guaranteed to remain functional during or following a DBE, test results have shown that the lamps remain functional. Attached are excerpts from the SEISMIC SIMULATION TEST REPORT CONTROL ROOM SUSPENDED CEILING (AX1AN03-27-1) summarizing these test results. Please note that the Increased Level Multifrequency Tests discussed in paragraph 6.4 are beyond

A001
1/1

the SSE envelope for Vogtle, hence the results to not adversely impact the conclusion that the luminous ceiling is designed and qualified to the Vogtle Seismic Category I requirements.

Should you have any questions, please inquire.

Sincerely,

J. A. Bailey

J. A. Bailey
Project Licensing Manager

JAB:jc

Attachment

xc: NRC Regional Administrator
NRC Resident Inspector
J. P. O'Reilly
P. D. Rice
L. T. Gucwa
R. A. Thomas
J. E. Joiner, Esquire
J. B. Hopkins (2)
G. Bockhold, Jr.
R. Goddard, Esquire
R. W. McManus
Vogtle Project File

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IDENTIFYING TITLE OF THIS DOCUMENT:

SEISMIC SIMULATION

TEST REPORT

(CONTROL ROOM SUSPENDED CEILING)

Bechtel Log No.

AXIAN03-27-1

IMPORTANT

Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligations.

DATE RECEIVED 12-2-87

SIGNED

DATE 12-7-87

DOCUMENT STATUS

1 ☒ WORK MAY PROCEED

2 ☐ REVISE AND RESUBMIT WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES INDICATED

3 ☐ REVISE AND RESUBMIT WORK MAY NOT PROCEED

4 ☐ INFORMATION ONLY DISTRIBUTION REQ'D? ☐ YES

M ☐ RESUBMIT – NOT ACCEPTABLE FOR MICROFILM WORK MAY PROCEED

PF-5986 (9510) 12/83

VOGTLE ELECTRIC GENERATING PLANT	JOB NO. 9510

EQUIPMENT TAG NO. NA

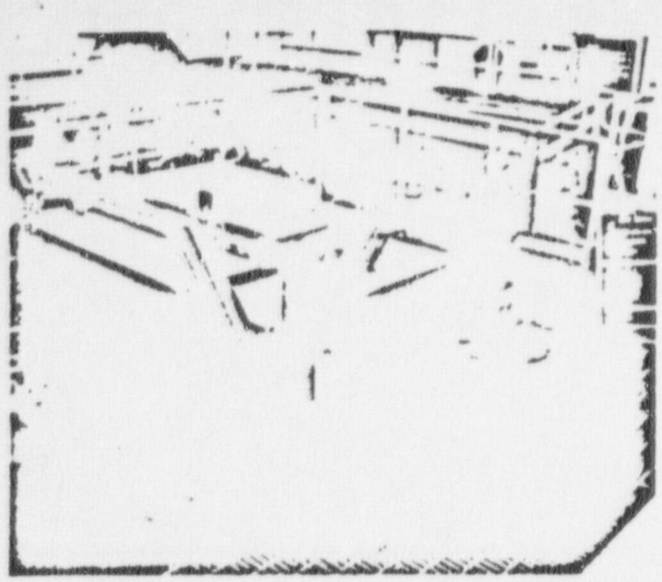
STARTUP DESIGNATION NO. 2-AA

ACTIVITY NO. NA

SYSTEM NO. NA

CATEGORY NO. NA

RETROFITTING REQUIRED ☐ YES ☒ NO



SEISM..C SIMULATION
Test Report

REPORT NO. 44815-2

WYLE JOB NO. 44815

CUSTOMER P. O. NO. 4-18232

PAGE 1 OF 130 PAGE REPORT

DATE August 25, 1980

SPECIFICATION (S) See References in Section 7.0

1.0 CUSTOMER Day-Brite Lighting

ADDRESS 1015 South Green Street, Tupelo, Mississippi 38801

2.0 TEST SPECIMEN A Compac Ceiling Light Module and an Incandescent Light Module

3.0 MANUFACTURER Day-Brite Lighting

4.0 SUMMARY

A Compac Ceiling Light Module and an Incandescent Light Module described in Paragraph 5.1, hereinafter called the specimens, were subjected to a Seismic Simulation Test Program as required by the Day-Brite Lighting Purchase Order Number 4-18232, and Wyle Laboratories' Seismic Test Procedure 541/1783-3/DK, dated April 24, 1980, Revision C. This test program was performed on July 10 and 11, 1980.

The test program consisted of biaxial resonance search testing, biaxial qualification level random multifrequency testing, and increased level random multifrequency testing in each of two test orientations. The specimens were instrumented with accelerometers and electrically powered during the test program. Prior to start of the test program, the original design of the Compac Ceiling Light Module was modified to incorporate horizontal restraints in the mounting configuration.

It was demonstrated that the specimens possessed sufficient integrity to withstand, without compromise of structures or electrical functions, the prescribed qualification level random multifrequency tests. However, some problems were experienced during the increased level multifrequency tests as described in Paragraph 6.4.1 and Table I.

STATE OF ALABAMA } ss
COUNTY OF MADISON }

Ala. Professional Eng.
Reg. No. 5683

T. Hampton Smith, being duly sworn, deposes and says: The information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects.

SEAL T. Hampton Smith

SUBSCRIBED and sworn to before me this 26 day of August, 1980

Virginia K. [signature]

Notary Public in and for the State of Alabama at large

My Commission expires June 13, 1983

PREPARED BY [signature] B. Pinkerton

APPROVED BY [signature] Herschel Jordan

WYLE Q. A. [signature] Kimbrell

WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP
HUNTSVILLE, ALABAMA

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6.0 TEST PROCEDURES AND RESULTS (Continued)

6.3 Qualification Level Random Multifrequency Test Procedures

The specimens were subjected to 30-second duration biaxial multifrequency random motion which was amplitude-controlled in one-third octave bandwidths spaced one-third octave apart over the frequency range of 1 Hz to 40 Hz. Two simultaneous, but independent, random signals were used as the excitation to produce phase-incoherent horizontal and vertical motions. The amplitude of each one-third octave bandwidth was independently adjusted in each axis until the TRS enveloped the RRS. The resulting table motion was analyzed by a response spectrum analyzer at 2% and 5% damping, and plotted at one-sixth octave intervals over the frequency range of 1 to 250 Hz.

Five (5) OBE tests were performed prior to application of the SSE test in each orientation. The OBE RRS are shown in Figures 1 through 4. The SSE RRS are shown in Figures 5 through 8.

6.3.1 Qualification Level Random Multifrequency Test Results

It was demonstrated that the specimens possessed sufficient integrity to withstand, without compromise of structures or functions, the prescribed simulated seismic environment.

Table I contains descriptions of the tests.

TRS plots of the control accelerometers from the SSE test in each orientation (analyzed at 2% and 5% damping) are presented in Appendix II.

6.4 Increased Level Multifrequency Test Procedures

Following completion of the multifrequency tests outlined in Paragraph 6.3, the specimens were subjected to increased level multifrequency testing.

The specimens were subjected to 30-second duration motion as described in Paragraph 6.2. The TRS was analyzed at 5% damping, and plotted at one-sixth octave intervals over the frequency range of 1 to 1000 Hz.

The input acceleration levels were increased in iterative levels until the TRS enveloped the RRS shown in Figures 9 and 10. After enveloping the RRS shown in Figures 9 and 10, the input accelerations were increased until the TRS enveloped the RRS shown in Figures 11 and 12. The horizontal RRS (Figure 11) was performed to the limits of the test machine over the frequency range of 1 to 1.6 Hz.

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6.0 TEST PROCEDURES AND RESULTS (Continued)

6.4.1 Increased Level Multifrequency Test Results

It was demonstrated that the specimens possessed sufficient integrity to withstand, without compromise of structures or functions, the prescribed simulated seismic environment with the following exceptions.

Post-Run 16 revealed that the top and bottom access panel had loosened. The two fluorescent lamps came out of their sockets as shown in Photographs 5 and 6. The safety straps retained the bottom panel.

The top and bottom access panel loosened during Run 17. It was noted that the retaining latches for the top access panel were rotating (during test), causing the panel to loosen as shown in Photograph 7. The top access panel was taped in place prior to Run 8.

The bottom access panel loosened during Runs 18, 19, 21 and 22; however, the panel was retained by the safety straps.

Prior to Run 19, the tape which had been applied to the top access panel was removed and twelve (12) No. 6-3/4-inch long sheet metal screws were added to hold the panel in place as shown in Photographs 8 and 9.

During Run 20, the bottom access panel loosened and three of the four safety straps broke, as shown in Photograph 10. The four stainless steel safety straps on the incandescent light module were replaced with safety wire. The four stainless steel safety straps were then installed on the bottom access panel.

The two fluorescent lamps stopped burning approximately 15 seconds into Run 22; however, the lamps functioned properly when reinserted into the socket.

The post-Run 22 inspection revealed the following discrepancies as shown in Photographs 11 through 19.

- One of the turnbuckles' threads were stripped (Photograph 11)
- One of the turnbuckles' rods was bent (Photograph 12)
- Some screws were missing from the outside corner of the box assembly (Photograph 13)

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6.0 TEST PROCEDURES AND RESULTS (Continued)

6.4.1 Increased Level Multifrequency Test Results (Continued)

- One of the hangers and mass rods was bent (Photograph 14)
- The rod holding the 94-pound mass was broken (Photograph 15)
- The light modules and spider brackets were misaligned (Photograph 16).

6.5 Specimen Response Procedures

Eight (8) specimen-mounted uniaxial piezo-electric accelerometers were provided for the specimen during the test program. Placement of the accelerometers was as shown in Photographs 3, 20 and 21.

FM tape recorders provided a record of each accelerometer response during the test program.

6.5.1 Specimen Response Results

Transmissibility plots from the resonance search tests are presented in Appendix I.

6.6 Electrical Powering Procedures

Electrical power of 115 VAC, 60 Hz, single-phase, was provided for the specimens during the test program.

6.7 Displacement Measurement Procedures

An LVDT was installed at one corner of the test fixture as shown in Photograph 22. The output signal of the LVDT was recorded on an oscillograph recorder.

6.7.1 Displacement Measurement Results

The maximum zero-to-peak deflections recorded during the test program are shown in Table I.